Surname	Centre Number	Candidate Number
First name(s)		0

GCSE

C300U20-1

S24-C300U20-1

MONDAY, 3 JUNE 2024 – MORNING

MATHEMATICS – Component 2
Calculator-Allowed Mathematics
FOUNDATION TIER

2 hours 15 minutes

ADDITIONAL MATERIALS

An additional formulae sheet.

A calculator will be required for this examination.

A ruler, protractor and a pair of compasses may be required.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Do not use gel pen or correction fluid.

You may use a pencil for graphs and diagrams only.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet. If you run out of space, use the additional page(s) at the back of the booklet, taking care to number the question(s) correctly.

Take π as 3·142 or use the π button on your calculator.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

You are reminded of the need for good English and orderly, clear presentation in your answers.

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**5**	
2.	**2**	
3.	**4**	
4.	**7**	
5.	**10**	
6.	**3**	
7.	**6**	
8.	**13**	
9.	**4**	
10.	**6**	
11.	**5**	
12.	**8**	
13.	**4**	
14.	**4**	
15.	**4**	
16.	**5**	
17.	**5**	
18.	**5**	
19.	**4**	
20.	**5**	
21.	**4**	
22.	**5**	
23.	**2**	
Total	**120**	

C300U201
01

JUN24C300U20101

Examiner only

Answer **all** questions.

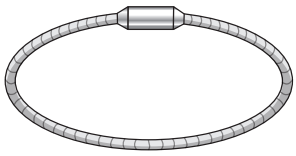
1. A shop sells bracelets.
Words can be engraved on the bracelet and charms can be added.
The price list is shown below.

Price List

 Flower charm **£18**

 Heart charm **£13.20**

 Star charm **£37.54**

 Bracelet **£45**

$\mathcal{A}\,B\,C\,D\,E$ Engraving **84p** for each letter

(a) Rhian buys a bracelet with a five-letter word engraved on it.
She also buys a heart charm.
What is the total cost of these items? [2]

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(b) Huw spent £187.70 on star charms.
How many star charms did he buy? [1]

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(c) Caitlyn has a special offer voucher.

Voucher
One bracelet and four flower charms for £95

Caitlyn bought one bracelet and four flower charms using the voucher.
How much cheaper is it to buy these items using the voucher than paying the usual price? [2]

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03

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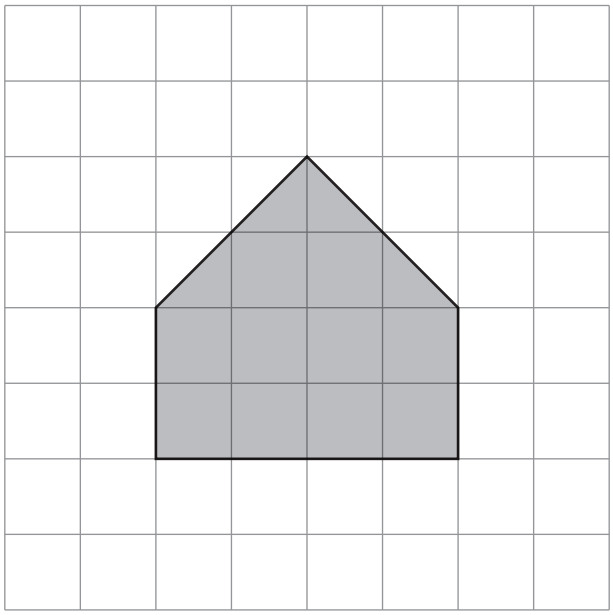
2. A shape is drawn on the 1 cm square grid below.



(a) What is the area of the shape? [1]

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The area of the shape is ..... cm^2

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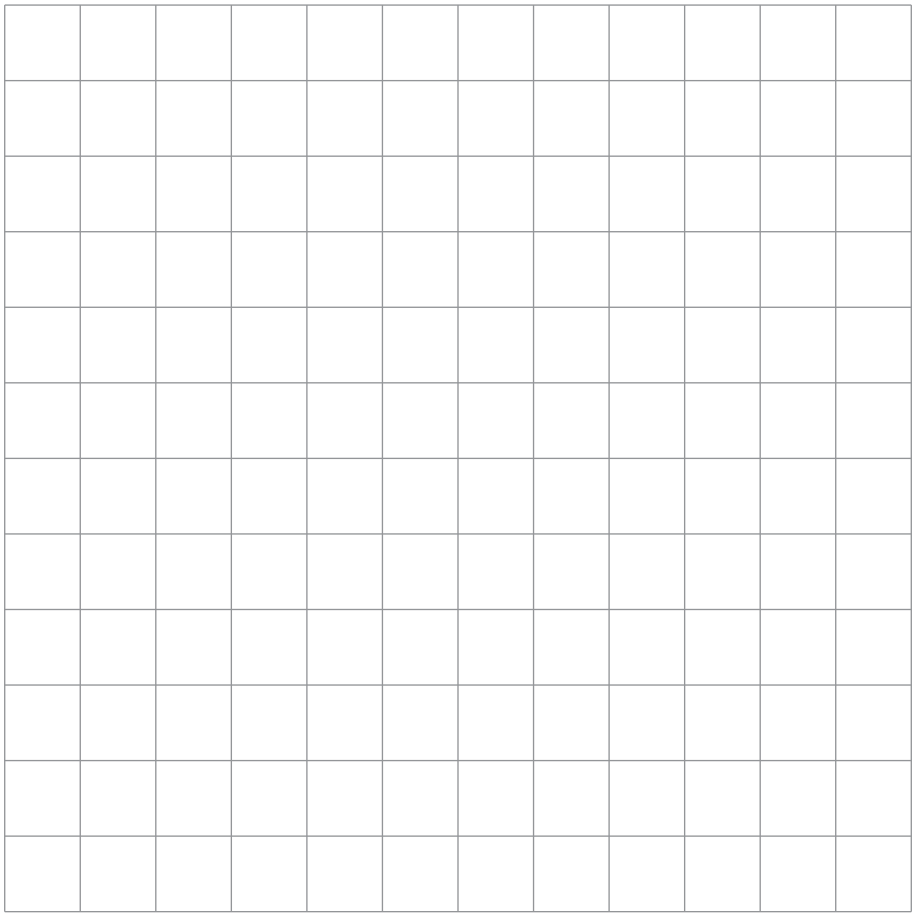
(b) On the 1 cm square grid below, draw a **rectangle** with the same area as the shape on page 4. [1]



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3.

15	20	31	91	169	200

From the numbers in the list above, write down:

(a) a multiple of 7 [1]

.....

(b) a factor of 100 [1]

.....

(c) a prime number [1]

.....

(d) a square number [1]

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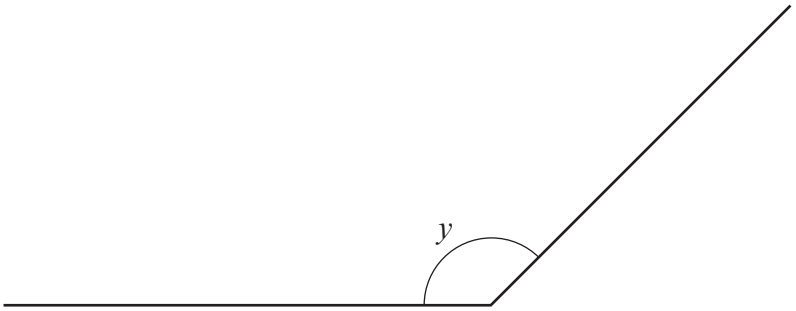
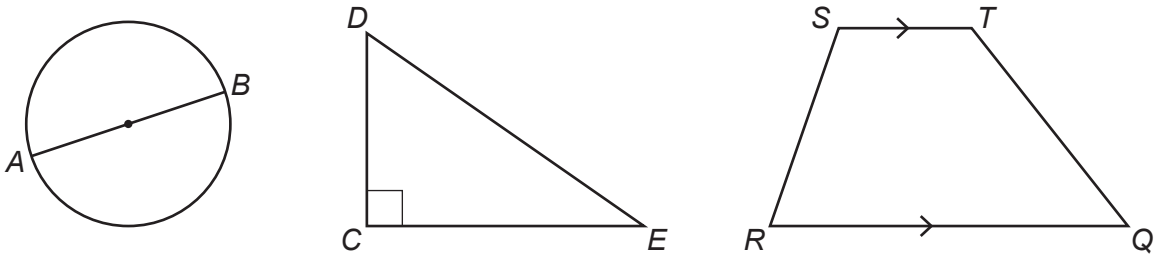
Examiner only

4. (a) Measure and write down the size of angle y. [1]



y = ... °

(b) A circle, a right-angled triangle and a trapezium are shown below.



circumference **parallel** **tangent** **isosceles**

perimeter **radius** **perpendicular** **diameter**

Use the correct words from the list above to complete each of the following sentences.

(i) The line *AB* is a ..... [1]

(ii) The lines *CD* and *CE* are ..... [1]

(iii) The lines *ST* and *RQ* are ..... [1]

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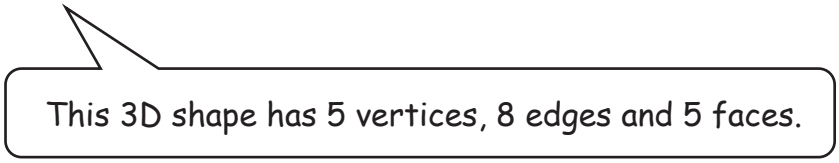
(c) Sadia describes a 3D shape.
She says,

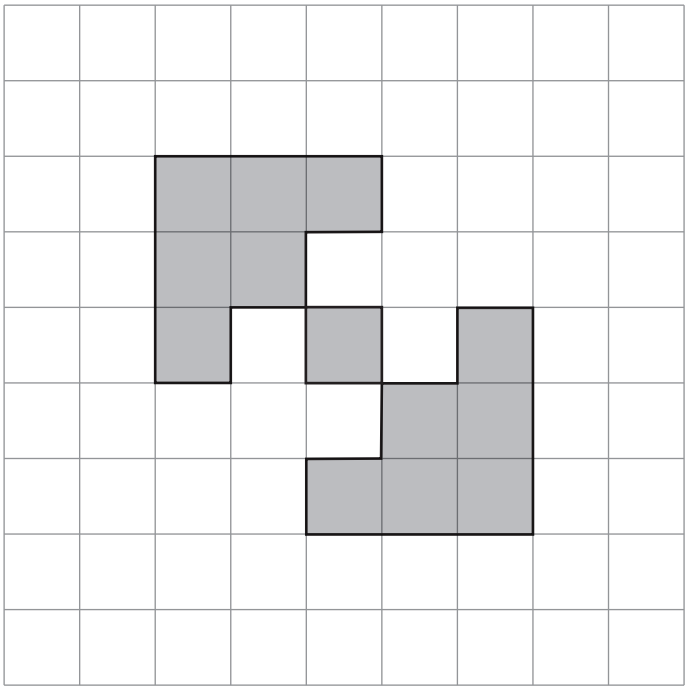


Which one of the 3D shapes listed below could be the one Sadia is describing?

Circle your answer. [1]

cuboid **triangular prism** **cube** **square-based pyramid** **cone**

(d) Mark all the lines of symmetry on the following diagram. [2]



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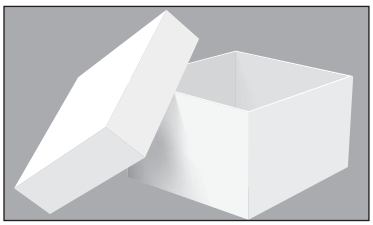
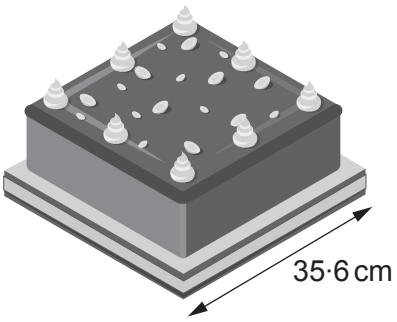
5. Austin owns a cake shop.



(a) He sells his cakes in boxes.

Austin buys some boxes.
Each box costs £1.35.
He pays a total of £63.75 which includes a £3 delivery charge.
How many boxes did Austin buy? [2]

(b) Austin uses cake boards to display his cakes.
Each board is square with sides of length 35·6 cm.
He puts ribbon around the perimeter of the boards for decoration.



Austin has 4 metres of ribbon.
He puts the ribbon around the perimeter of **two** cake boards.
The ribbon does not overlap on either board.

How much ribbon will Austin have left over? [4]

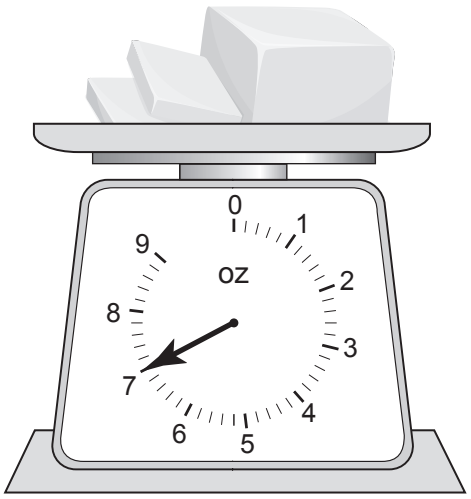
Austin will have ..... of ribbon left over.

Examiner only

(c) Use the information below to convert between ounces and grams.

1 ounce (oz) = 28·35 grams (g)

(i) The scales below show how many **ounces** of butter Austin uses to make 1 cake.



How many **grams** of butter does Austin need to make **3** cakes? [2]

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(ii) Austin buys bags of sugar.
Each bag has a mass of 500 g.

What is the mass of one bag of sugar in **ounces**?
Give your answer to the nearest ounce. [2]

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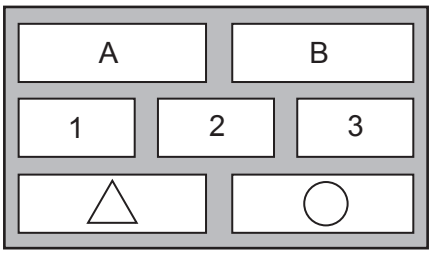
6. Jade must enter a code to open her safe by pressing three buttons.
The code consists of one letter, one number and one shape.



(a) List all the possible code combinations.
One has been completed for you. [2]

Letter	Number	Shape
A	1	△

You may not need to use all the lines.

(b) Jade has forgotten her code.
She enters one letter, one number and one shape at random.

What is the probability that she enters the correct code? [1]

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Examiner only

7. Vikram follows a Mediterranean diet.
The table below shows the proportion of each food group Vikram should eat each day.

Vikram's Mediterranean Diet

Food group	Proportion of diet
Whole grains and pasta	36%
Vegetables and fruit	30%
Fish, meat, and dairy products	20%
Olive oil	9%
Sugar	5%

(a) What **fraction** of the Mediterranean diet is made up of olive oil and sugar?
Write your answer in its simplest form. [2]

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(b) On Monday, Vikram ate 456 grams of fish, meat, and dairy products.
How many grams of sugar should Vikram have eaten on Monday? [2]

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(c) On Tuesday, Vikram ate a total of 1350 grams of food.
How many grams of whole grains and pasta should Vikram have eaten on Tuesday? [2]

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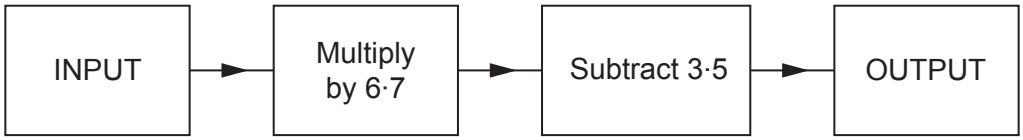
Examiner only

8. (a) (i) The diagram shows a number machine.



When the OUTPUT is 83·6, what is the INPUT? [1]

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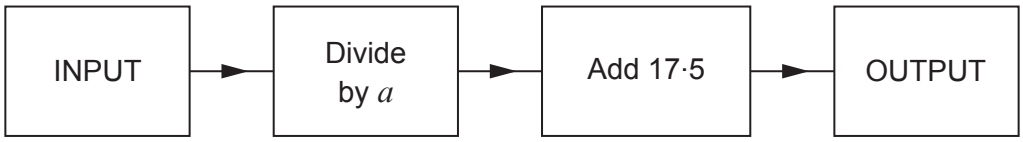
(ii) A different number machine is shown below.



When the INPUT is 22, the OUTPUT is 37·5.
Find the value of a. [2]

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Examiner only

(b) The original price of a toy is £t.
In a sale, the toy is one third of its original price.
Write down, in terms of t, the sale price of the toy. [1]

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(c) A bag contains x sweets.
Rona buys 8 of these bags.
She also has 5 sweets left from a previous bag of sweets.
Write down, in terms of x, the total number of sweets Rona has.
Simplify your answer. [2]

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(d) Simplify $5f + 16f \times 7$. [2]

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(e) Expand $8(9p - 3)$. [1]

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(f) Solve $5x - 2 = 11$. [2]

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(g) What is the square root of 31?
Give your answer correct to 2 decimal places. [2]

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Examiner only

9. The table below shows distances between some places in New Zealand.

All distances are in kilometres (km).

	Auckland	Cape Reinga	Hicks Bay	Napier	Taupo
New Plymouth	357	797			
Rotorua	234	670	290		
Thames	114	550	414	349	
Wellington	658	1094	718	323	380
Whakatane	298	737	205	308	165

Use the table to answer the following questions.

(a) Complete the sentence. [1]

The distance between ..... and ..... is 414 km.

(b) Sharon drove from Wellington to Taupo.
The journey took 4 hours and 30 minutes.

Calculate the average speed of Sharon's journey in kilometres per hour. [3]

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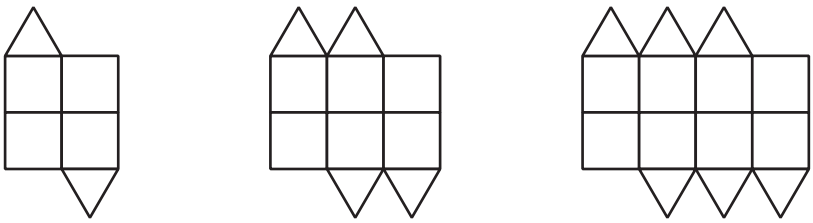
Examiner only

10. (a) The following sequence of patterns is made using squares and triangles.



Pattern 1 **Pattern 2** **Pattern 3**

(i) Draw Pattern 5 in the space below. [1]

(ii) Is it possible for one of the patterns in the sequence to have 23 squares and 21 triangles?
Give a reason for your answer. [1]

Yes ☐ No ☐

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(iii) Write down the nth term for the number of **squares** in the pattern. [2]

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(b) The nth term of a different sequence is $4n - 5$.
Write down the first 3 terms of the sequence. [2]

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Examiner only

11. Mr Gregory plans to buy drinks and crisps for the school shop.
Drinks and crisps are sold in multipacks.
The costs for these are shown below.

Drinks multipack (28 drinks)

Price: £5.35

Crisps multipack (35 packets)

Price: £4.27

Mr Gregory buys the **least** number of each multipack so that he has an equal number of drinks and packets of crisps.

How much will this cost?
You must show all your working. [5]

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Total cost is .....

Examiner only

12. (a) The exterior angle of a regular polygon is 24°.

(i) How many sides does it have? [2]

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(ii) Calculate the sum of all the interior angles of this polygon. [2]

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Examiner only

(b) The diagram below shows a quadrilateral *QRST*.
QS is parallel to *UT*.
$Q\hat{R}S = 84°$, $R\hat{Q}T = 110°$ and *QR* = *RS*.

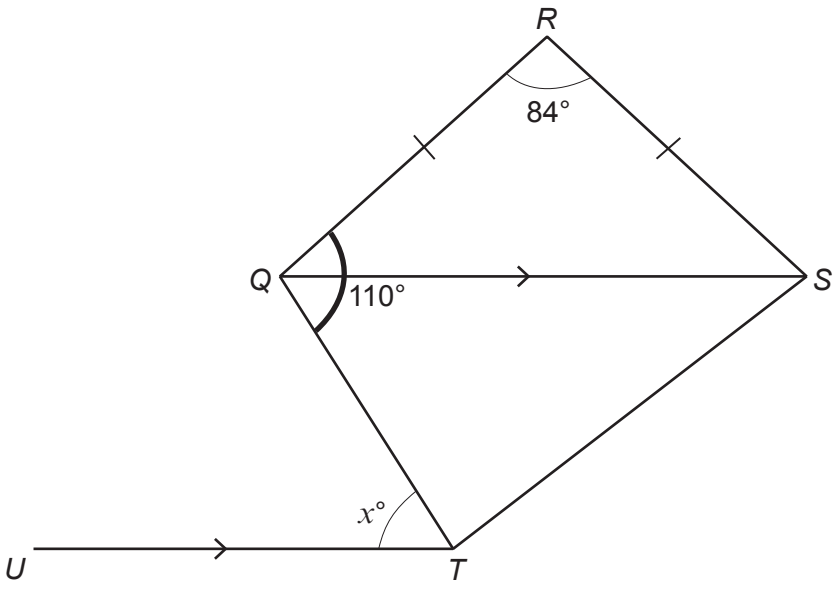

Diagram not drawn to scale

Calculate the value of x.
Give a reason for each step of your answer. [4]

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x = ... °

Examiner only

13. (a) Cara wants to find out if people travel abroad each year and how often.
She plans to stand outside her local travel agent on Tuesday afternoon and survey 35 people.
Give **two** reasons why Cara's plan is **not** likely to give reliable results. [2]

Reason 1

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Reason 2

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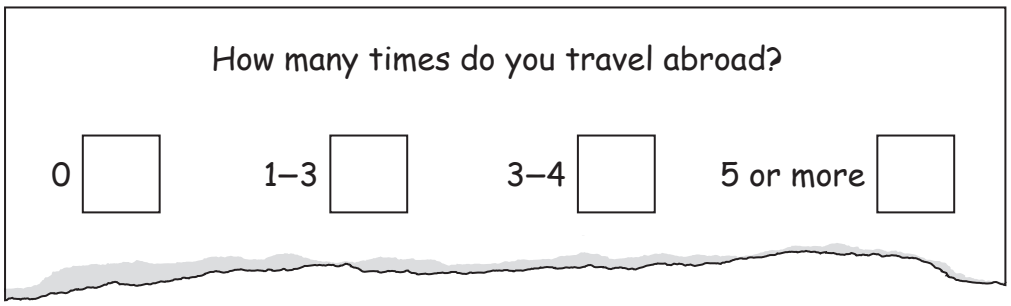
(b) Cara uses a questionnaire to carry out her survey.
One of the questions is shown below.



Give **two** criticisms of the question. [2]

Criticism 1

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Criticism 2

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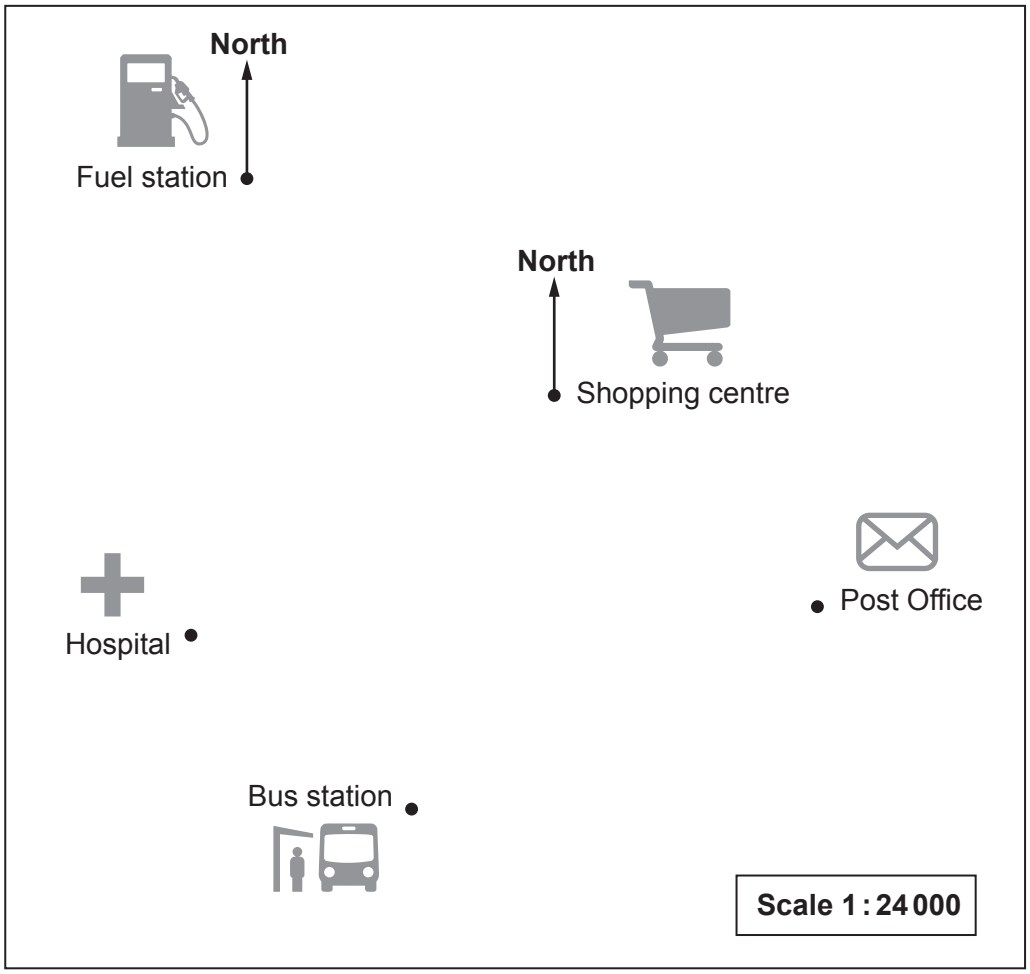
Examiner only

14. The scale drawing below shows the positions of some places in a town.



(a) What is the straight-line distance between the post office and the bus station? Give your answer in **metres**. [3]

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(b) What is the bearing of the shopping centre from the fuel station? [1]

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Examiner only

15. Frank is making some fruit drinks.

(a) Frank makes one drink using orange juice and lemonade in the ratio 1 : 5.
He pours 390 ml of this drink into a glass.

How many ml of lemonade will there be in the glass? [2]

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(b) Frank makes a different drink using apple juice and lemonade.
He pours 120 ml of apple juice into a glass.
He then pours lemonade into the glass until there is 390 ml of drink.

Write down the ratio of apple juice to lemonade in the glass.
Give your answer in its simplest form. [2]

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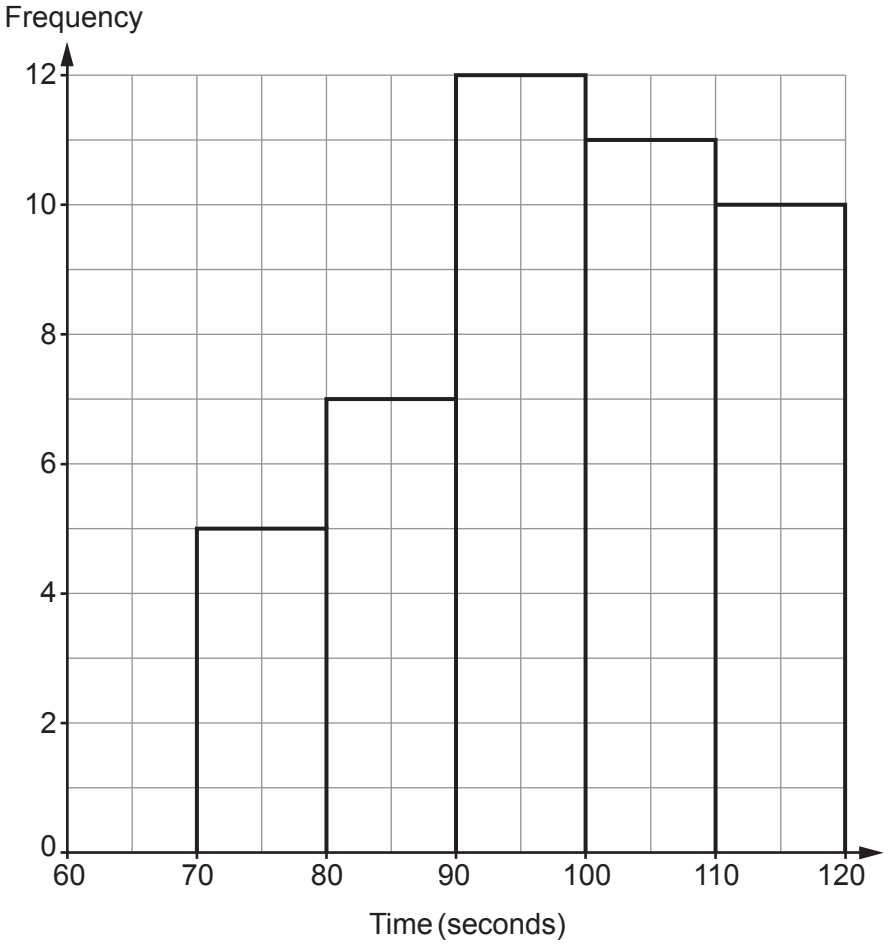
The ratio is ..... : .....

Examiner only

16. 45 students took part in a 400 m race.
Their times, in seconds, were recorded.
The frequency diagram below shows the results.

The groups used are as follows:

$70 \leqslant \text{time} < 80$, $80 \leqslant \text{time} < 90$, $90 \leqslant \text{time} < 100$, $100 \leqslant \text{time} < 110$ and $110 \leqslant \text{time} < 120$.



Calculate an estimate for the mean time it took to complete the race. [5]

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Examiner only

17. (a) Factorise $x^2 - 5x - 24$. [2]

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(b) Simplify $\left(3h^2\right)^3$. [2]

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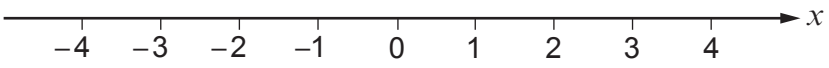
(c) Represent the inequality $-2 < x \leqslant 3$ on the number line below. [1]



Examiner only

18.

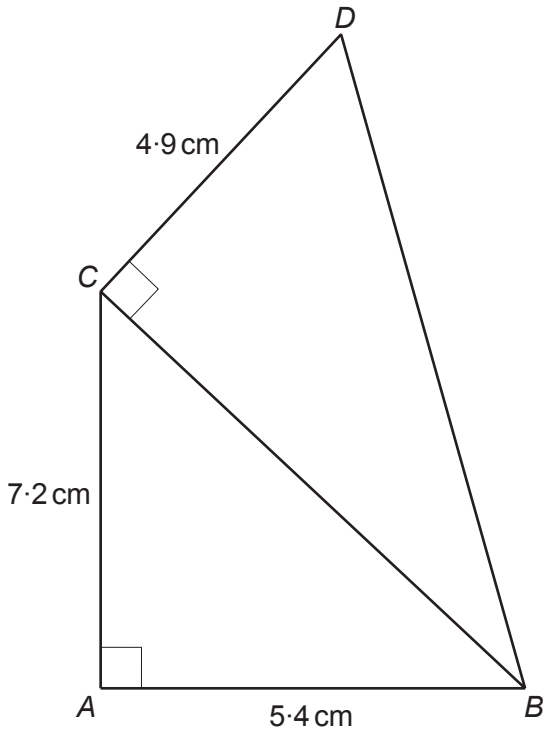


Diagram not drawn to scale

ABC and *BCD* are right-angled triangles.
AB = 5·4 cm, *AC* = 7·2 cm and *CD* = 4·9 cm.

Calculate the area of triangle *BCD*. [5]

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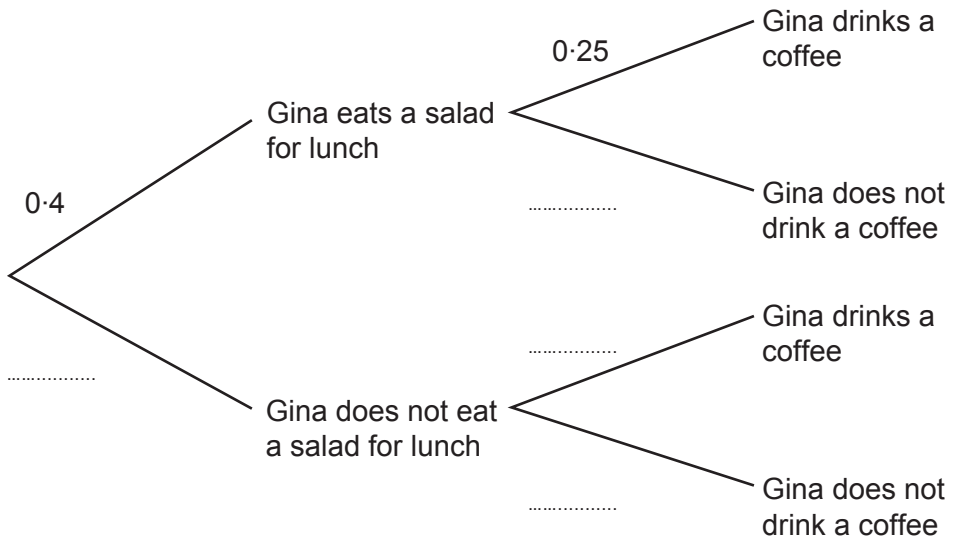
Area of triangle *BCD* is ..... cm^2

Examiner only

19. For her lunch, Gina sometimes eats a salad and sometimes drinks a coffee.
The probability she eats a salad for lunch on a given day is 0·4.
The probability she drinks a coffee on a given day is 0·25.
Eating a salad for lunch and drinking a coffee are independent.

(a) Complete the following tree diagram. [2]



(b) Calculate the probability that, on a given day, Gina does not eat a salad for lunch but does drink a coffee. [2]

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Examiner only

20. When a ball is dropped, the maximum height it reaches after each bounce decreases.

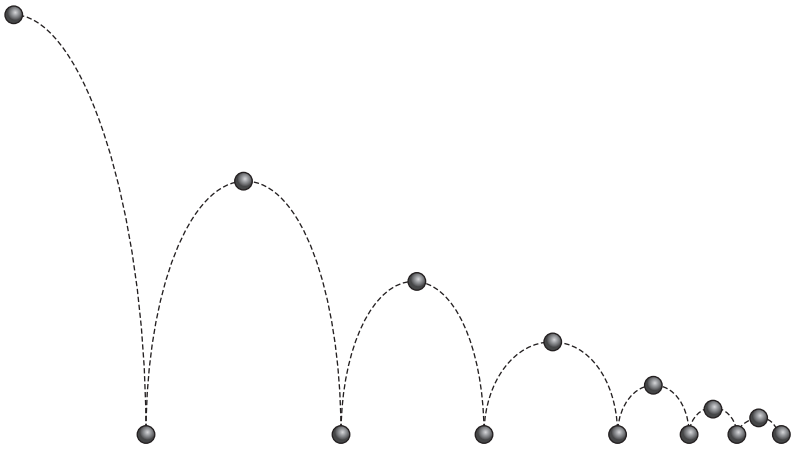

Diagram not drawn to scale

Maddox says,

Each time the ball bounces it reaches a height that is 55% of the maximum height reached on its previous bounce.

(a) The ball is dropped from a height of 4 m.

What height will the ball reach above the ground after its 7th bounce? [3]

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(b) (i) State any assumptions you have made in answering part (a). [1]

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(ii) What effect could your assumption have on your answer to part (a)? [1]

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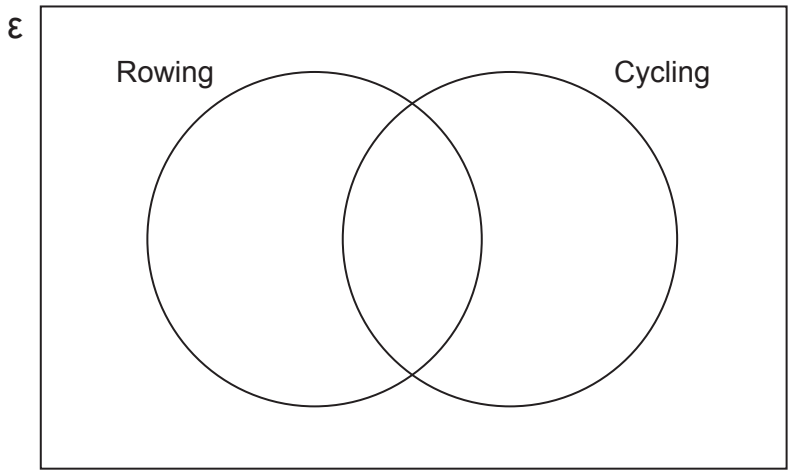
Examiner only

21. There are 50 people in a sports club.
Two of the sports the people can take part in are rowing and cycling.

Of these 50 people:

- 27 take part in rowing
- 32 take part in cycling
- 8 do not take part in rowing or cycling.

(a) Complete the Venn diagram to show this information. [2]



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(b) One person is chosen at random from the sports club.
Find the probability that they take part in rowing but not in cycling. [2]

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Examiner only

22. Abdul is travelling from the UK to Brazil for a holiday.
Abdul has £825 to exchange for Brazilian reals (R$).
The exchange rate is £1 = 6.27R$.
The bank Abdul uses to exchange his money only has 50R$ notes.

What is the maximum amount of Brazilian reals Abdul can buy and what will this cost him in pounds?
Give your answer correct to the nearest penny.
You must show all your working. [5]

23. Make R the subject of the formula $P = \sqrt[3]{RQ}$. [2]

END OF PAPER